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Chimps of a feather sit together: chimpanzee friendships are based on homophily in personality

Massen, Jorg J M ; Koski, Sonja E

Abstract: Several recent studies show that animal friendships, like human friendships, are durable and have fitness benefits by increasing survival, infant survival, or reproductive success. However, the determinants of especially non-kin friendships are unclear. Human non-kin friendships are partly determined by similarity in personality. We investigated personality similarity of friends in 38 captive chimpanzees. Within-subject comparisons revealed that friends are more similar than non-friends in their Sociability and Boldness. Subsequent analyses, including both kin- and non-kin dyads, revealed higher similarity in Sociability among all individuals who sat in contact more often, while in Boldness and Grooming Equity the positive effect of similarity was only found in non-kin individuals' contact-sitting. Our results show that similar to humans, chimpanzees' friendships are related to homophily in certain personality characteristics, particularly those relevant for socio-positive and cooperative behaviour. We suggest that having friends similar to self in personality decreases uncertainty in interactions by promoting reliability especially in cooperative contexts, and is consequently adaptive. Further, we suggest that homophily in human friendships dates back at least to our last common ancestor with chimpanzees.

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Electronic supplementary material for:

Massen, J. J. M. & Koski, S. E. *Chimps of a feather sit together. Chimpanzee friendships are based on homophily regarding certain personality traits.*

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Table S1. Name, sex, year of birth and history of animals in the study. Maternal relatedness is shown by placing offspring below and further to right from the mother. Individuals between closed brackets died before the start of our studies. #: animals too young or not yet born during the *social* personality study (Koski, 2011) and therefore not included in the analyses of Sociability, Grooming Equity, Anxiety, and Positive Affect. *: animals too young, died, or transferred before the onset of the *non-social* personality study (Massen et al., 2013) and therefore not included in the analyses of Boldness and Exploration-Persistence;

Arnhem Group

Fons	♂B	1975	(born in captivity)
(Gorilla)			
Gaby	@	1984	(born in captivity)
Goya	@	1993	(born in captivity)*
Galathea	@	1999	(born in captivity)*#
Gizhee	@	2003	(born in captivity)*#
Ghineau	B	2005	(born in captivity)*#
Giambo	♂B	1989	(born in captivity)
Geisha	@	1993	(born in captivity)
Mama	@	ca. 1957	(wild caught)
Moniek	@	1977	(born in captivity)
Morami	@	1987	(born in captivity)
Marka	@	1984	(born in captivity)
Tepel	@	ca. 1959	(wild caught)
Teshua	@	1986	(born in captivity)
Tushi	@	1992	(born in captivity)
Tjobbe	B	2003	(born in captivity) *#
Jimmy	@	ca. 1960	(wild caught)
Jing	B	1981	(born in captivity)
Joury	B	1994	(born in captivity) *
Amber	@	ca. 1968	(wild caught)*
Allity	@	1998	(born in captivity) *#
Sabra	@	1986	(born in captivity)*
Saphira	@	2001	(born in captivity) *#
(Zwart)			
(Zola)			
Zombi	@	1993	(born in captivity)*
Zarno	B	1997	(born in captivity) *#
Zaira	@	1983	(born in captivity)*
Zouly	B	1993	(born in captivity)*
Zwala	@	1999	(born in captivity)*#
Roos	@	1979	(born in captivity)
Roani	@	1989	(born in captivity)*
Raimee	@	1999	(born in captivity)#

Amersfoort group

Mike	αB	±1965	(wild caught)
Sonja	@	±1964	(wild caught)
	Belle @	1977	(born in captivity)
	Willy @	1991	(born in captivity)
	Wingu B	2009	(born in captivity)* #
	Kumi B	2001	(born in captivity)
Sjors	@	±1966	(wild caught)
	Ghafula @	1999	(born in captivity)*
	Ituri @	2003	(born in captivity)
Kokki	@	±1966	(wild caught)
Jet	@	±1970	(wild caught)
Sylvia	@	±1974	(wild caught)
	Sanne @	1989	(born in captivity)
	Bibi @	1996	(born in captivity)
	Karibuna βB	2000	(born in captivity)
Chura	@	1997	(born in captivity)

Table S2. Varimax rotated principal component loadings of the 11 behavioural variables of the *social* personality traits. Principal component analysis was done on $n = 90$ individuals, including the Arnhem and Amersfoort chimpanzees. All variables included in the PCA showed sufficient repeatability values as calculated with intra-class correlations, indicating that within-individual variability was smaller than between-individual variability (range ICC: 0.23 – 0.86). KMO = 0.56 indicated sufficient sampling adequacy; all variables had communalities > 0.4 . Four components were extracted based on Parallel Analysis and a Scree plot. Loadings $> \pm 0.4$ are shown with bold typeface.

	Sociability	Grooming equitability	Anxiety- aggression	Positive affect
No. neighbours	0.717	0.328	0.025	0.248
Grooming received	0.943	-0.156	0.044	0.044
Grooming given	0.908	-0.180	0.173	0.052
Gr. density given	0.027	0.900	0.086	-0.049
Gr. density received	0.093	0.893	-0.023	-0.155
Activity	0.234	-0.623	-0.135	-0.048
Autogroom	0.062	0.134	0.851	-0.021
Self-scratch	0.037	-0.052	0.912	0.100
Aggression	-0.308	-0.290	-0.415	0.071
Play	0.024	-0.110	-0.158	0.903
Affinitive behav.	0.198	-0.022	0.223	0.858
Eigenvalue	2.82	2.46	1.52	1.43
% variance explained	25.68	22.39	13.76	13.0

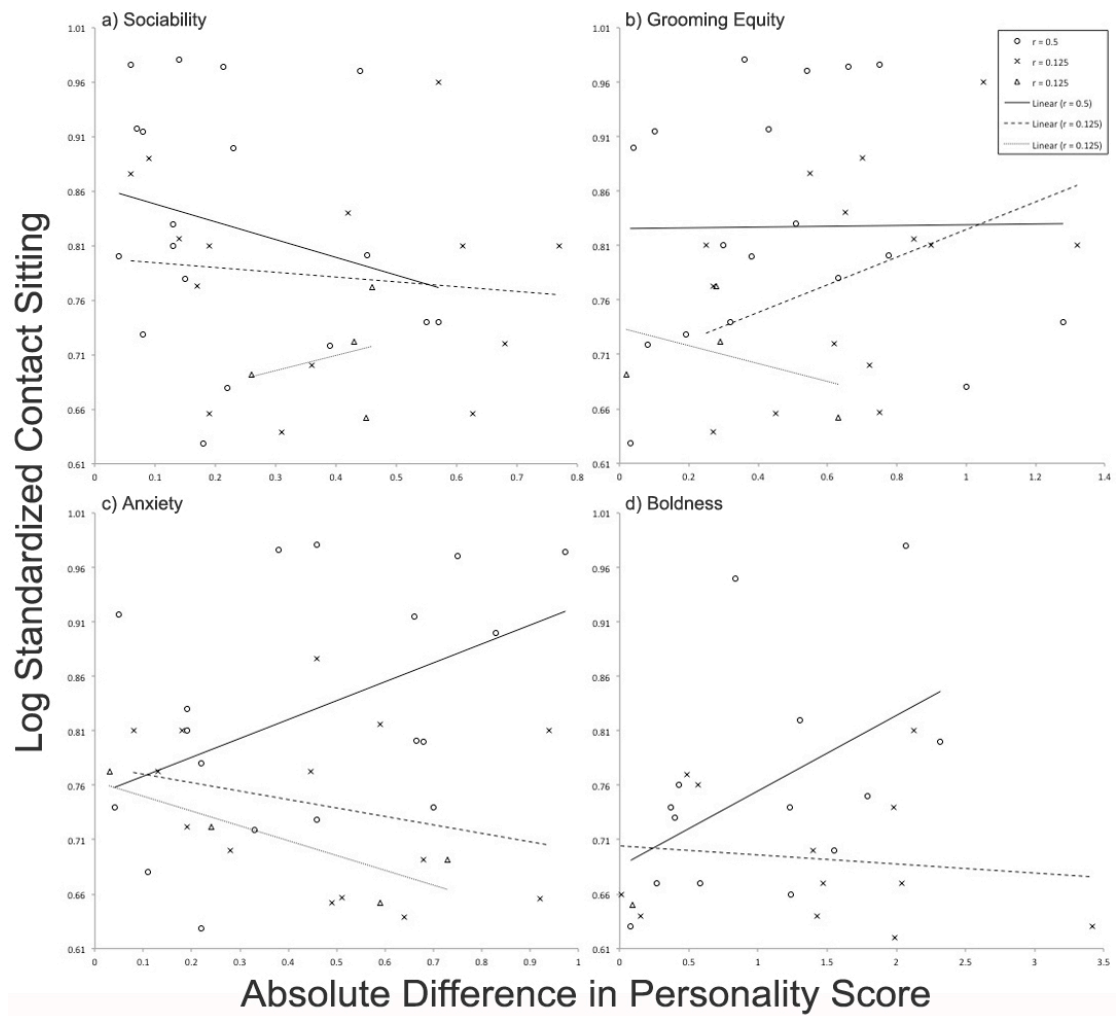


Fig. S1. Relation between Contact sitting (log of standardized values) and the absolute difference in personality scores of a) Sociability, b) Grooming Equity, c) Anxiety, and d) Boldness, for the different kin-classes ($r = 0.5$; $r = 0.25$; $r = 0.125$).

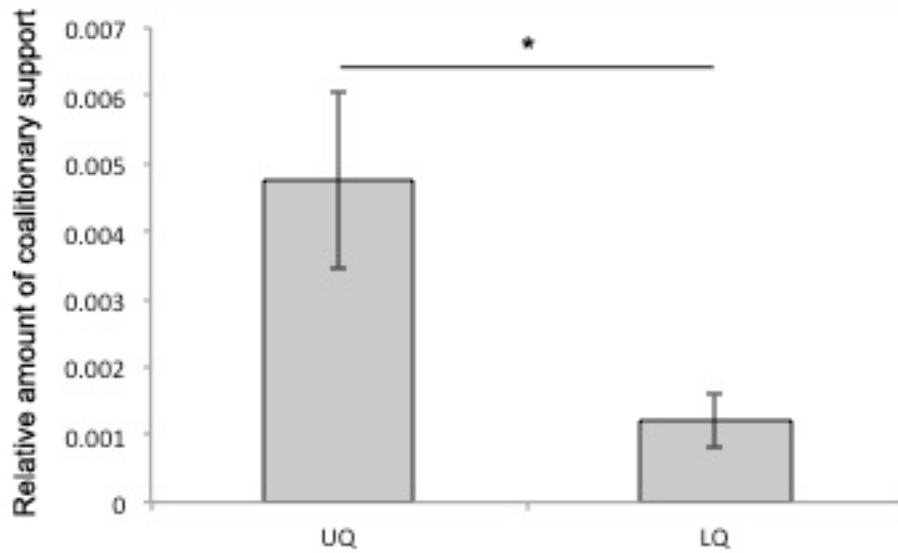


Fig. S2. Mean \pm SEM relative amount of coalitionary support (frequency/opportunity to support) of the Arnhem chimpanzees in the period 2002-2004 ($N = 22$) with their non-kin ‘friends’ (those individual in their Upper Quartile (UQ) of contact sitting data), and with their non-kin ‘non-friends’ (those individual in their Lower Quartile (LQ) of contact sitting data). Wilcoxon signed ranks test: $T^+ = 90$, $P = 0.016$.

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